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Teledermatology provides better access to care for the patient, a short turn around time for replies from the dermatologist and a savings of time, costs and resources by eliminating the need to send the patient to the dermatologist.

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N/A For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

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N/A In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.

Dr. Hon Pak

Mentor – Signature Date

Table of Contents

Cover.....	1
SF 298.....	2
Foreword.....	3
Table of Contents.....	4
Introduction.....	5
Body.....	5
Key Research Accomplishments.....	7
Conclusions.....	7
References.....	8
Appendices.....	9

Introduction:

The GPRMC Teledermatology Research Project uses a secure web based consult system to provide dermatology support to outlying, remote health care providers in the TriCare CONUS Area of Responsibility, therefore reducing lost duty time and decreasing costs of transportation and per diem. Teledermatology consults have been received from Ft's. Leavenworth, Leonardwood, Polk, and Hood. Plans are underway to extend this service to Ft. Huachuca and Ft. Sill, and Ft. Sam Houston.

This initiative will encompass establishing a single point of contact at the Regional level for all Teledermatology issues to include coordination of quality assurance for the headquarters and participating subordinate Medical Treatment Facilities (MTFs) of the GPRMC. The work will be performed at the Brooke Army Medical Center, Dermatology Department.

BODY:

Improve the access of patients to services throughout the region by providing access to a dermatologist.

Improve access of patients to dermatology services throughout the region.

Educate medical staff on use of telemedicine that may be applied in theater / battlefield / peacekeeping applications.

Clinically monitor effects of dermatology treatment using telemedicine.

Reduce travel time and costs for providers, patients, and family members.

Reduce cost by eliminating the need for contract dermatologist services.

Minimize the amount of lost duty days.

Patient

Family member/escort

Test equipment to gain valuable knowledge of use and / or practicability in effective theater / battlefield / peacekeeping applications.

Assess ability to diagnose and treat quickly using telemedicine.

APR-MAY99:

It has been determined that through the use of Teledermatology, a savings of travel dollars, as well as per diem and time lost by patient and patient's family escort has been achieved. Initial installation of PC's provided by TATRC for this project was achieved at three installations; Ft's Leavenworth, Leonardwood, and Polk. Consults were slow to begin with, but soon we were receiving 5-10 consults per week from each location. As cost of equipment is low, and a basic LAN or T-1 line already exists at each facility, web access was accomplished with no problems.

Created Consult Manager User Guide (Attachment II)

JUN99

Introduced weekly Dermatology Newsletters to remote facility Consult Physicians and Consult Managers. This newsletter addressed problems and solutions within the web system, as well as questions and answers. There remains a problem with Consult Managers training additional personnel on use of digital camera and web system, as there are many troops on deployment, PCS, or on leave. 18 consults, 4 registered users.

JUL99

Only have two dermatologists on staff at this time. Problems are being discovered using macro lens and improper lighting procedures. Suggestions included disabling auto flash on camera, and not using the macro lens. Weekly consults are not being submitted. One staff dermatologist has suggested honoring each Physician in Charge and the Consult Manager at each facility with a certificate of Contribution. GPRMC will think about this.

AUG99

Bulletin Board Service (BBS) Pass word changes to meet new security requirements. Disaster in the form of all data lost from web server. The server crashed, and all data for GPRMC was lost. There has been no backup of this system done by TATRC since the projects' inception.

SEP99

Remote facilities and in-house dermatologists remain upset and frustrated over loss of data on the web server. Work with web programmer at TATRC, attempting to recreate some, if not all consults. Experienced problems with BBS. When I try to access, I get a message that my account has not been created. When I try to re-register I get a message that my account already exists. SQL Server failure, system inaccessible for 1 day. TriCare Telederm meeting.

OCT99

Morale and faith in the Teledermatology web-based system continues to be low. Attempts to recreate consults are still an ongoing process. So far, images and consults have been recovered, but cannot be matched up together. Experienced difficulty with remote areas uploading and sending consults. Questions were raised whether my position was funded for travel. Project administrator from TATRC informed GPRMC that \$5,000 was provided to each MEDCEN for local travel. Received request from Ft Leonardwood to receive training by one of BAMC's dermatologists on dermoscopes for images; however, the Chief of Dermatology declined, as it would take more than a few days to cover all the dimensions of using a dermascope. . None of the participants from the other regions knew of any use of a dermascope

NOV99

We are re-uploading missing consults using the information contained on the patients' SF513.

ACTION ITEM:

* Need Local Project Managers to provide SF513s from ALL of their Clinical Consults from 1 May 1999 up through 8 November.

Information requested from Consult Managers was as follows: to provide SF513's from 1 May to 8 November 99.v This action was completed and most consults were completed in a short time. Some images could not be re-established. This demonstrates the necessity of performing system backups and testing of system backups to ensure they work properly at all times.

DEC 99

2 consults 2 new users.

Key Research Accomplishments

- Provided remote caretakers with the ability to request Teledermatology consult anywhere internet access is available
- Reduced costs (Per Diem and Travel) by avoiding sending patient to dermatologist. Also avoided TRICARE network consultation costs.
- Improved access to dermatology services for Patient and Provider. Development of secure web based Teledermatology Consult system using Cold Fusion.
- Establishment of Dermatology Patient Consult Database.

Conclusions

Observations:

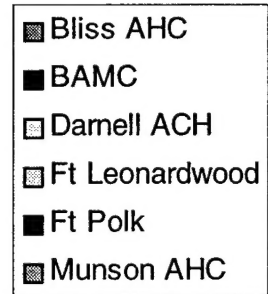
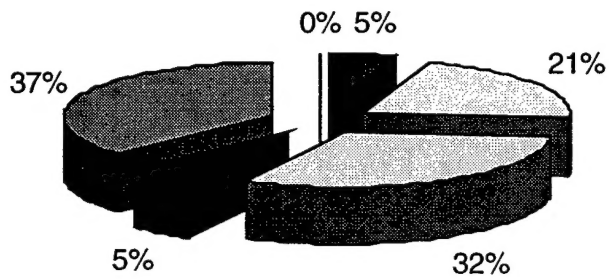
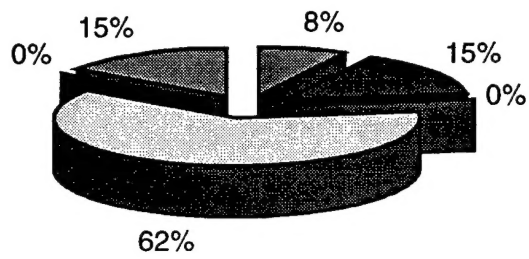
1. The clinicians at the local levels seem to view this project as an increased burden, due to the fact that previous procedures the Primary Care Clinician completed an SF513, and forwarded it to the TRICARE Contractor for scheduling and administrative tasks. With the Teledermatology System, the Primary care Clinician is responsible for completion of the consult, image acquisition, and patient follow-up, as well as care delivery. The impact on the Primary Care Clinician is an added task in an era where they are being pressured to increase productivity. Having one person at each facility assigned as Consult Manager was considered to be an honor at each facility. However, when the recognition of the time involved for taking images, and uploading them, along with patient history to the secure web server was realized, the project seemed to slow down a little more.
2. Initially users are enthusiastic and appreciative. With extensive use the administrative burden associated with Teledermatology results in a decline in use. A Drag & Drop system whereby information and images could be dropped into a bundle to be uploaded as a package would greatly enhance the user's interest, as less time would need to be spent going through each page on the web system.
3. The use of web technology supports the primary care mission beyond normal duty hours, and allows timely consult requests as well as responses. 24/7 access achieves availability with relatively minimal server downtime
4. The use of web technology allows access from any location due to web-based design. The insertion of minimal additional equipment (digital cameras, camera memory and digital card readers) contribute to the Cost-effectiveness of the project. This is a viable recourse which could have far-reaching ramifications in the way the Military conducts its medical business either in the field or in medical clinic or hospital.
5. In the beginning months, Command Level at each facility supported deployment of this technology, with the exception of Ft. Polk, as they already has an assigned dermatologist. However, Ft. Polk has used the system during periods when the dermatologist was not available (TDY, leave, etc.).
6. Problems such as improperly configured PC's and late arriving equipment were dealt with quickly, minimizing the impact on the project itself.
7. System is inflexible and does not allow for modification of site specific items without program modification from the developer.
8. The system runs well when the server and local LAN is running optimally, but too frequently slows down significantly(to a point where a new user may be disappointed and not use the system).
9. The additional effort required for a Teledermatology consult is not automatically recorded into the workload reporting systems for credit to the Primary Care clinic. Should this be made possible, the Clinic Directors will be more inclined to use the system.
10. Images are stored in jpeg form, which is not DICOM 3.0 compatible.
11. Some Jpeg images that are sent from each clinic seem to be come distorted. This may be due to loss of data during transmission.

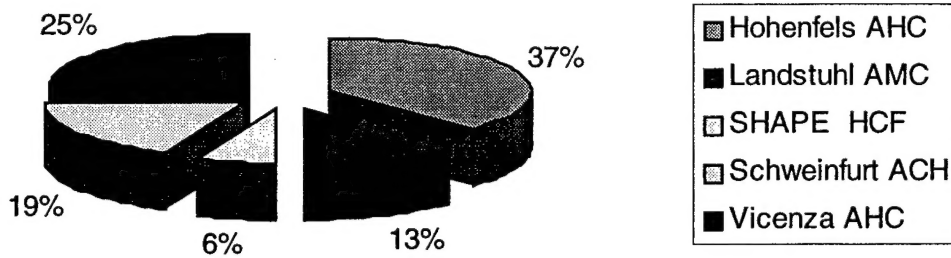
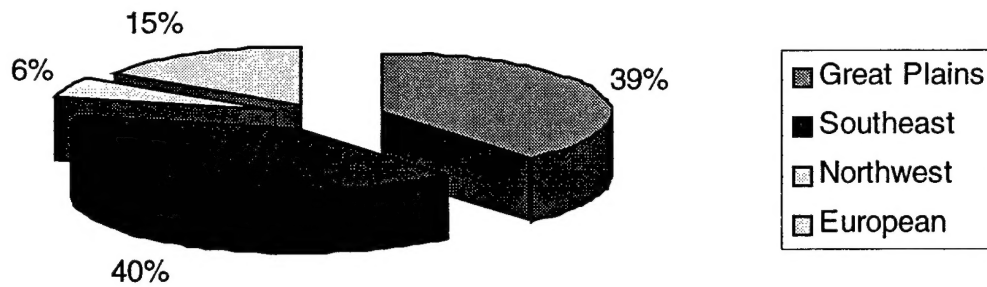
Recommendations:

1. Further programming is required for modification of site-specific items, as well as further developments in web-based programming
2. Web-based Forms need modification to decrease keyboard/mouse entry and improve human interface
3. An exploration of problems with LAN and WAN, as well as server congestion needs to be looked at to develop alternatives to ensure quick system response. We are not sure where the problem is. Perhaps we should look at the database and compression technology for the images.
4. Since Electronic patient records are becoming reality, we need to make this system DICOM and HL-7 compliant along with building an interface to the CHCS if we are to make this system a success.
5. Site selection should be based on a needs assessment.
6. The system MUST be streamlined, and made simpler. A drag and drop system, whereby the Consult Manager can do a one page patient information form, perhaps in PDF form, and drop that, along with the images, into a bundle to be transported to the receiving facility could be of significant interest.
7. Make all images DICOM compliant, to verify check image construction during transmission to remote point.
8. Suggest that color ink jet printers (readily available for under \$300 each) be made available to each MTF for documentation of patient images into patient records.

References

NONE





As you can tell from this chart, Southeastern and Great Plains experienced the greatest success with clinic usage and data gathering. Additional value information are on the following two pages:

Appendices (Attachment #1).

**AMEDD
Triservice Site Status Report**

As of 12 July 1999

Region	Site Name	Update	Site	Reg.	Reg.	Consults		Site(s)
		D/M	Code	ConMgr	Phys	Trainin g Total	Clinica l Total	Average #Consult/Wk
Southeastern	1Blanchfield ACH	29-Jun	BA	1	0	1	0	0.2
	Charleston AFB	1-May	CA	0	0	0	0	0
	2DDEAMC Ft Gordon	"	DD	2	1	0	0	0
	Fox AHC	"	FA	0	0	0	0	0
	Key West NBMC	"	KW	0	0	0	0	0
	Kings Bay NMC	"	KB	0	0	0	0	0
	3L. Joel AHC Ft. McPherson	6-Jul	LJ	0	1	0	5	1
	4Lyster ACH	1-May	LA	2	0	0	0	0

MacDill AFB	"	MD	0	0	0	0	0
Martin AHC Ft.	"						
Benning	"	MA	0	0	0	0	0
5Moncrief ACH Ft.							
Jackson	14-Jun	MC	8	2	0	11	2.2
Moody AFB	1-May	MB	0	0	0	0	0
NH Jacksonville	"	NJ	0	0	0	0	0
6NH Roosevelt Roads	29-Jun	RR	0	1	0	2	0.4
NHB Beaufort	28-Jun	NB	0	0	0	0	0
7NHC NAVSTA	23-Jun	NH	1	1	0	3	0.6
Noble AHC	1-May	NO	0	0	0	0	0
8Patrick AFB	30-Jun	PT	2	2	0	7	1.4
Robins AFB	28-Jun	RA	0	0	0	0	0
Shaw AFB	1-May	SH	0	0	0	0	0
US Southern HC	"	UC	0	0	0	0	0
Winn AHC Ft.							
Stewart	"	WA	0	0	0	0	0

Sub Total			16	8	1	28	5.8
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Great Plains

9Bliss AHC	25-Jun	BL	0	1	5	0	1
10Brooke AMC	7-Jun	BK	1	0	2	4	1.2
Brooks AFB	1-May	BS	0	0	0	0	0
Corpus Christi NA	"	CC	0	0	0	0	0
11Darnell ACH	"	DA	4	0	0	0	0
Evans AHC	"	EV	0	0	0	0	0
Irwin AHC	"	IR	0	0	0	0	0
Lackland AFB	"	LD	0	0	0	0	0
12Med Dept Act Ft.							
Leonardwood	29-Jun	LW	6	12	3	7	2
13Munson AHC	15-Jun	MU	7	1	0	2	0.4
NAS Ingleside	1-May	IN	0	0	0	0	0
NAS Kingsville	"	KI	0	0	0	0	0
Randolph AFB	"	RM	0	0	0	0	0
Reynolds AHC	"	RE	0	0	0	0	0
14USMEDDAC Ft.							
Polk	1-Jul	PO	1	32	4	1	1
William Beaumont							
ACH	1-May	WL	0	0	0		0

Sub Total			19	46	14	14	5.6
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Northwest

15Everett NBMC	25/6	ET	0	0	2	0	0.4
Fairchild AFB	1-May	FR	0	0	0	0	0
16Madigan AMC	1-May	MG	0	0	0	0	0
17McChord AFB	1-May	MR	5	2	0	0	0

18NH Bremerton	21/5	BT	1	0	1	0	0.2
19NH Oak Harbor	14/6	OH	4	5	0	1	0.2
Umatilla AHC	1-May	UM	0	0	0	0	0
Sub Total			10	7	3	1	0.8
European							
20Hohenfels AHC	25/6	HO	6	2	2	0	0.4
21Landstuhl AMC	1-May	LR	2	2	0	0	0
22Schweinfurt ACH	7-Jul	SC	3	5	0	6	1.2
23SHAPE HCF	15/6	SA	1	7	1	2	0.6
24Vicenza AHC	1-May	VI	4	3	0	0	0
Sub Total			16	19	3	8	2.2
TOTAL			61	80	21	51	14.4

Notes:

1. # = an Active Site (24/51 sites)
2. As of 1 May 1999 the Average # of Consults transmitted/site is: **3**
(a.) Calculation for Average # of Consults transmitted per Site is: $=\text{SUM}(\text{E89} + \text{F89})/24$
3. Calculation for Average # of Consults per Work Week is: $=\text{SUM}(\text{E}\#, \text{F}\#)/5$.
(a.) Based on a 5 Day Work Week.
4. Update D/M is the Day/Month of consult activity.

Brooke Army Medical Center
Teledermatology Project

Consult Manager Use Only

Published 5-18-99

CONSULT MANAGER NAME:

LOG IN:

Password: